



# NEW IDEAS

Ensuring NASA project successes.

## IDEAS TO ADDRESS KNOWLEDGE DRAIN

*Achieving Success in the New Era at NASA*

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Addressing the challenge of losing hands-on experience,  
decision-making ability, and safety awareness in the critical next 20 years

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# The Challenge

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- As the agency takes steps to initiate a new program of exploration while closing out older programs, a new generation of NASA engineers and contractors retire from the business
- This is due in part to the natural business cycle which is retiring those who have started in industry during the early 70's/post-Apollo era
- Thirty years later, the impact of "knowledge lost" may seriously impact future projects and the space exploration roadmap

# Knowledge Drain

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- This knowledge drain is one of two critical challenges facing the agency. Apollo-era and early Shuttle-era staff and contractors will be all but gone in the next years. The few that stay must become leaders to the majority of the space agency working staff
- This is a significant challenge in light of the new profile of planned space exploration initiatives in the next two decades
- One solution is to utilize tools and technology aids in a formal system of knowledge transfer

# Efficiency Gain

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- A second challenge is to increase the efficiency of the existing and new human capital working on programs
- As we close out current programs with limited budgets, and initiate the exploration initiatives with a new an untested "go as you can pay" model, NASA will be challenged by the need to "ramp up" new agency staff and contractors

# Solution

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- The recommended approach from a strategic view is the design of a system of learning that achieves the goal of knowledge retention and real-time access in order to ramp-up staff and contractors to new programs and projects
- This solution must be simple to use, without a lot of moving parts. At the same time, it will include an array of tools, resources, and leaders that will drive the knowledge transfer necessary to achieve success in existing and new programs at the agency
- There is the hope that both private sector and public sector experiences and lessons learned will be used to implement the program

# Execution

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- This section will describe
  - a strategic, enterprise approach with respect to the program and project management at a high level. This 30,000 ft view will allow managers to have a visual architecture that can be reviewed at a later date
  - lower level tool types and processes will be briefly demonstrated as a possible solution
  - new advanced technologies (such as those being tested at NASA center R&D shops and the DoD) that could assist program and project managers cut costs and risks and by meeting the two challenges of "knowledge drain" and "ramping up" to achieve success)

# Processes, Tools

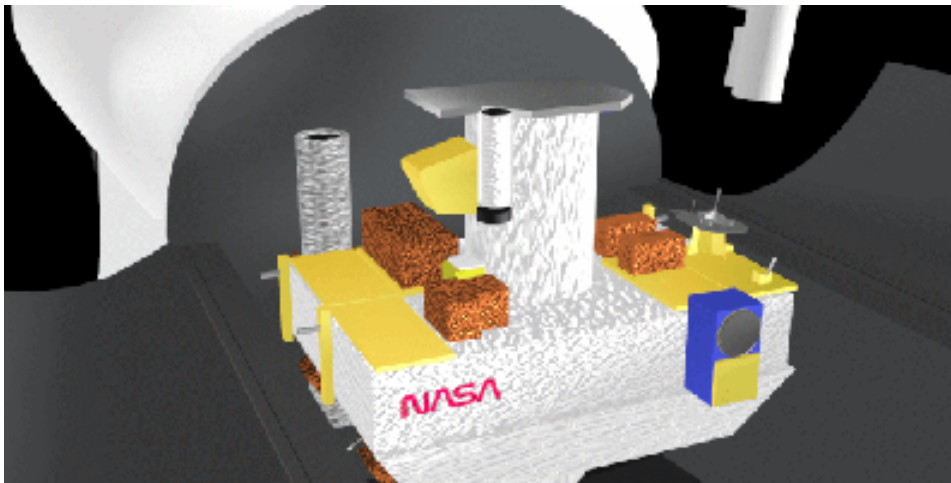
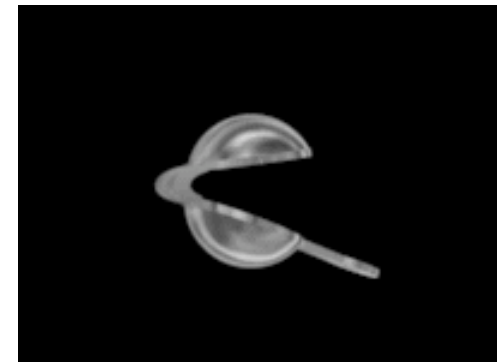
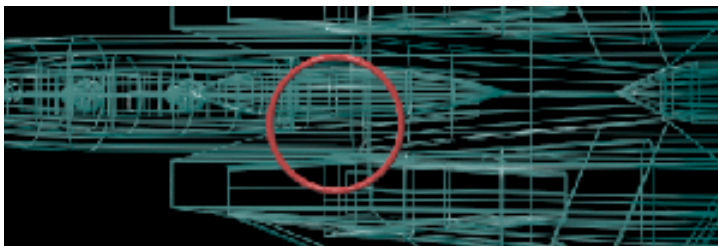
Ensuring NASA project successes.

- This knowledge transfer must go well beyond "orientation." Probable themes will be analytical safety engineering at all levels, culture and culture change management, collaboration skills, and executive/management and leadership skills
- It must also be added that these can not be generic off-the-shelf content from industry but new, focused, and relevant content from existing and retired NASA and contractor personnel
- The solution must include:
  - Methodology and means to transfer knowledge from senior to middle-level staff
  - Quick access to information from all levels of staff and contractors
  - Highly usable, visual and text references that can be downloaded, added to, and referenced.

# Visualization

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Simulating operations, engineering principles, project experiences



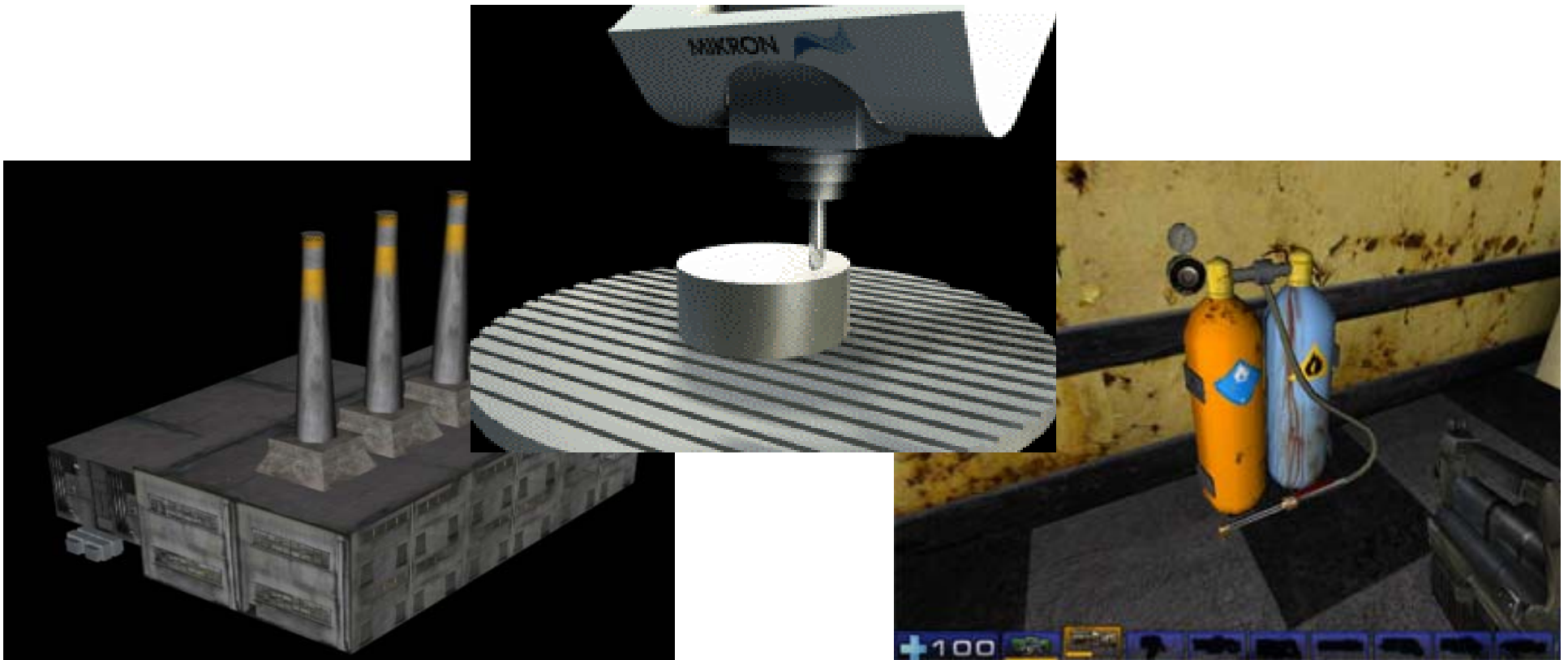


# Commercial Industry

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Educational and business simulation and training

*Taking advantage of a "100% market growth rate"*



# DoD Example

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Courtesy, Stratus Simulation Inc.

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# Basic Needs

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- At a 30,000 ft level, the following is needed:
  - Processes performed at the Code level to benefit the Code...thus the benefits and effort are tightly connected. Same for projects
  - System that houses the data in a logical manner, and available to all NASA personnel and contractors
  - Support tools and support contractors to rapidly develop the content

# Create Content

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- Uploading the content
  - Nomenclature is developed to categorize subjects and topics
  - A matrix is kept to drive data population of content matter, each staff member is tasked to identify their basic daily processes, unique and critical issues and decision processes, and vital reference materials
  - This effort is required in an initial dump, and as an on-going weekly effort

# View Content

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- Downloading
  - Access is provided by search query, drilling down categories, or by staff position/person
  - The user learns on Day 1 and as sections are updated. The updates are easy to find
  - All content plays on a standard browser with Java enabled (for applets), Flash MX plug-in (for animation and other interactivity), and X3D (for virtual reality (more about this later))

# System

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- Taking a simplified version of a learning management system analogy (managed course content), a system would be easy to implement (HIPAA example below)





# System-2

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- Content will be a simplified means to upload text, graphics, and simulations based on simple web formats



# "No joy?"

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- If there is a problem in development or during a mission, the database can be referenced in real-time

The screenshot shows a web application titled "Flashpoint™ For HIPAA". The interface includes a navigation menu on the left with links like "Course Catalog", "Operating Mode", "My Profile", "Change Password", "My Flashpoint", and "Office Projector". The main content area displays a "Course Catalog" with a total of 25 courses available. It features search filters for "View" (All Courses, All courses for which I am approved) and "Course Type". A table lists several courses with columns for Title, Type, Description, Add to MyPlan, and My Status.

Title	Type	Description	Add to MyPlan	My Status
<a href="#">Time Management Study</a>	Single user cd based	Time Management Techniques for busy professionals		APPROVED
<a href="#">Java Programming</a>	Video-based	Intermediate Java Programming		APPROVED
<a href="#">HIPAA Awareness</a>	Web-based interactive	This class provides you an introduction to the basic principles outlined in the HealthCare Information Portability and Accountability Act of 1998.		APPROVED (univ)
<a href="#">HIPAA Training for US Military</a>	Web-based interactive	US Army HIPAA Training interactive web course		APPROVED (univ)
<a href="#">ISO 9001</a>	Instructor-led	ISO 9001 standards for Product Certification		APPROVED



# Technologies

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- Content can include text, graphics, and reference material
  - Simple animation, 3D models and animation, and interactivity can be developed by a core of contractors working continuously
  - Each Code will work with content developers which will also begin understanding the Code's business and way of working (added continuity)

# Technologies-2

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- Low-cost virtual reality (two methods)
- Using Flash interactivity, it is possible to take 3D models and create interactive, virtual representations
- Using a relatively new format, X3D (next generation VRML), a learner will be able to control his/her experience in the environment
- Native files will be available as "open content" for users to create their own content

# Benefits

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- Local knowledge benefits local managers/staff
- The enterprise gets a view across Codes at a surprising/useful level of detail
- Engineers in various disciplines can communicate better by re-using content
- Troubleshooting becomes easier in development, testing, or mission operations
- Safety can be greatly increased by defining issues in detail and logging design and operational concerns and waivers
- Knowledge drain is minimized with quick ramp-up of new staff
- Turf wars based on withheld knowledge are greatly reduced

# Other Benefits

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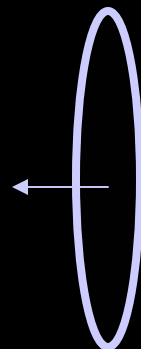
- Crew, management, PR, and those in non-engineering positions will have quick access to certain technical explanations, hopefully, in a more visual manner
- Concept engineers (Phase A and B) will develop more feasible system concepts earlier on
- Tie-in to students and instructors in colleges could offer "instant content" and thus provide our industry a smarter, more qualified candidate

# Examples-1

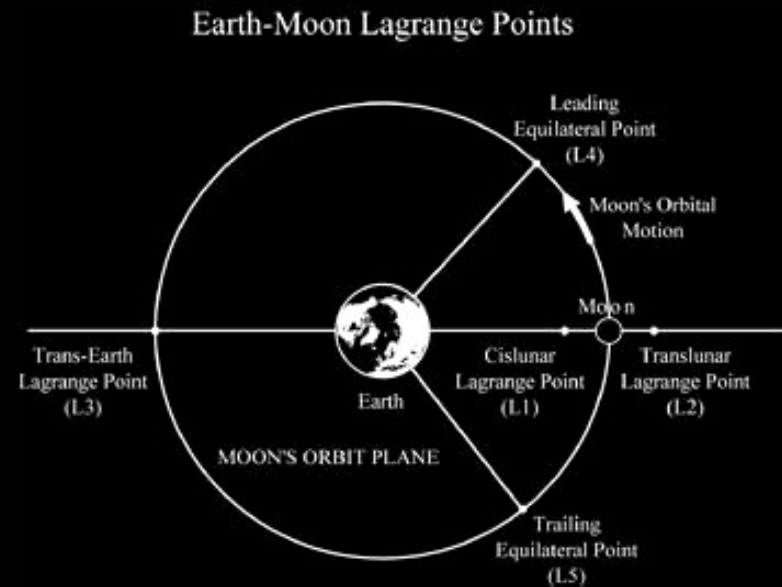
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The Mission Profile is based on its temporary orbital position around L-3.

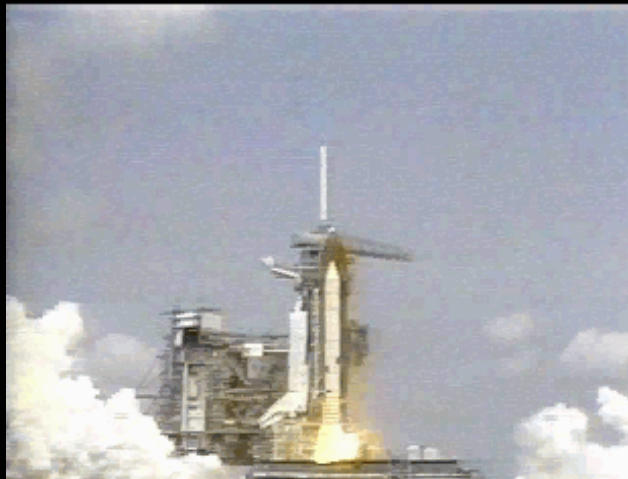


L-1



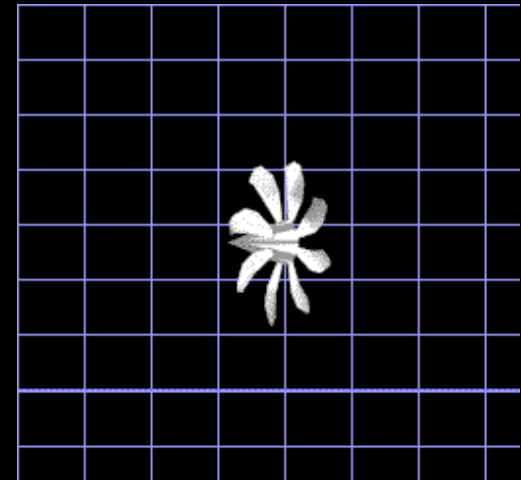
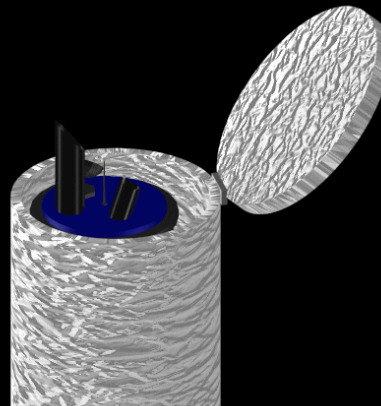
# Examples-2

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Add text here

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# Examples-3

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## Driver safety: Common Driver Distractions

Please find the dangerous distractions by mousing over them below.



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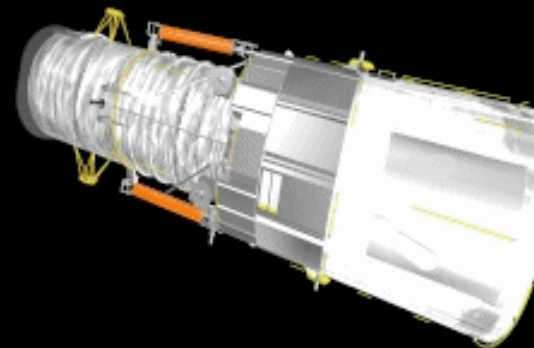


# Examples-4

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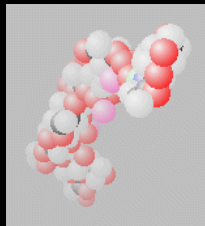


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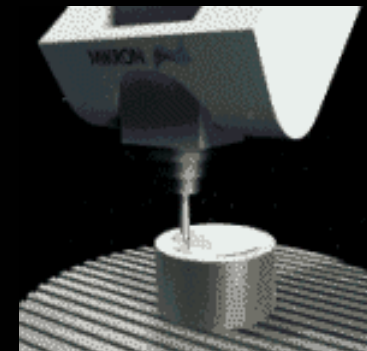


# Examples-5

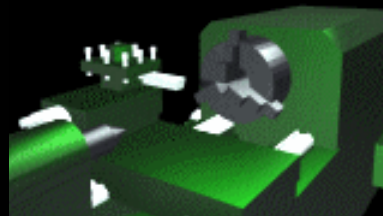
Ensuring NASA project successes.



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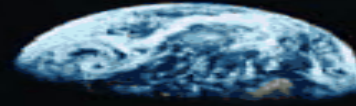


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# Examples-6



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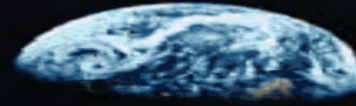


*Flashpoint*™



Add text here

# Examples-7

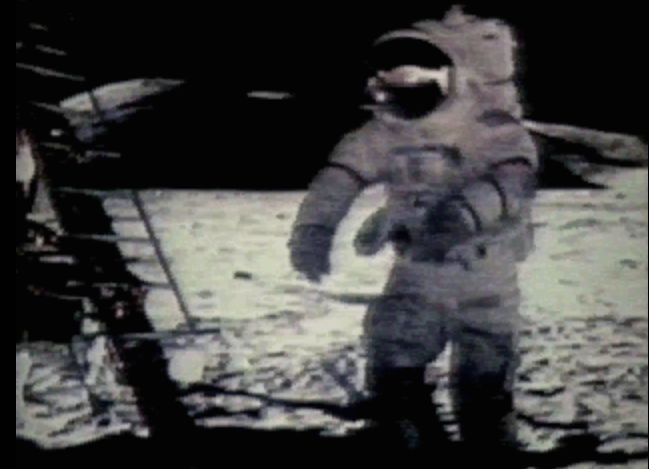


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*Flashpoint*™

Add text here



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# The Future

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## Knowledge Backbone Concept



Management User



Supervisor User



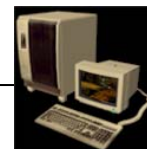
Staff User



Admin/Tech Support User



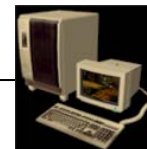
Competency Application  
On-Line Assessment Tool, Legacy  
HR Database Integration



Web-based Registration,  
Training Management Interface  
to new HR and ER, other legacy



Instructor Led Training  
Competency Match, Room  
Reservation and Setup System



Knowledge-Base for Continuity;  
Analysis Engine;  
Troubleshooting Engine



e-Learning Courseware,  
Database-Driven Multimedia,  
Built-in Metadata,

Real-Time  
Reports



People, Job Positions



Competencies



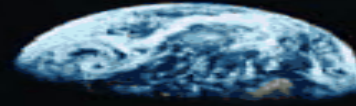
Registrant Profiles, Training Activities,  
Learning Plans, Supervisors, Mandatory  
Training Categories, Reservations,  
Classes, Courses, Instructors, Scores,  
Certifications, Reminders, Learning  
Accounts, Budgets

# Bottom Line

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- A fairly simple notion
  - populating a database with text, graphics, and interactive animation/simulation to contain, manage, and utilize space agency knowledge for future generations of staff and contractors
  - the trick is in the execution

# APPENDIX



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## Who are we?

- Web-based learning and simulation design and development company
- Innovative and agile software developers
- Experts in aerospace, NASA, and DoD projects

## Why people work with us:

- Lean, low-cost
- Strong team
- Free Learning Management System software
- Latest technologies in web based simulation

# Our Team

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NAME	TITLE	BACKGROUND HIGHLIGHTS	EDUCATION
Link Parikh	Partner	*20 years in Executive and Technical *Co-founder, CEO, Product Inventor *Concept Engineer, Design Engineer - Space shuttle and Space station projects -Advanced military projects, simulation	*B. S., Mechanical Eng , Southern Methodist University
Dr. Moira Turner	Chief Computer Scientist	*Over 20 years experience in -Flight simulation -Space robotics simulation -Web software R&D and applications development -Business simulations	Ph.D Computer Sciend, William and Mary (4.0 GPA) MS in Computer Science , William & Mary B. S. Computer Science, Heriot- Watt University, Scotland.
Mike Passov	Principal Software Engineer	-Over 15 years exp in: -Systems Analysis -Automation Systems -Statistical modeling	MS in EE, Moscow Aircraft Eng Inst. Advanced Systems, Databases & Info Systems, Moscow
Pat Tormey	Program Manager	Over 15 years exp in -IT -Statistical analysis , - -HR and Project Management	Doctorate-Sociology (statistical modeling) (ABD) UNC Advanced Systems Development
Dao Huynh	CEO	CEO of DNDS, Inc., an e-Learning company (10 yrs) -success in Federal and Fortune 500 bids - world-class multimedia deliverables - world-class web training deliverables	B.S. Architectural Engineering Executive Management Programs: Darden, Kellogg, etc. Numerous awards and recognitions



# The End

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- Comments?